

1. A method of selecting operational parameters for transmitting a signal over a communication channel of a communication network, the method comprising the steps of:

5 transmitted over the communication channel;

(b) selecting an initial set of parameter values for transmitting a signal over the communication channel based on the RF conditions determined from the received signal;

10 of parameter values differ from parameter values in the initial set of parameter values by less
than a predetermined amount;

(d) choosing from among candidate sets of parameter values a selected set of parameter values having a highest expected performance among the candidate sets of parameter values; and

15 parameter values.

2. The method of claim 1, further comprising the steps of:

20 by more than a predetermined amount, wherein parameter values in said additional candidate sets of parameter values differ from parameter values in the previous set of parameter values by less than a predetermined amount; and

wherein the candidate sets of parameters in step (d) include the additional candidate sets of parameter values.

25 3. The method of claim 1, wherein step (b) includes forming a system state vector from the initial set of parameter values, and steps (c) and (d) carry out a system state transformation on said system state vector.

4. The method of claim 1, wherein the performance of each candidate set of parameter values is represented by a pre-computed weight, and wherein step (d) includes selecting the

candidate set of parameter values having a weight corresponding to a highest performance.

5. The method of claim 1, wherein the initial set of parameters includes at least one of: data rate, packet length, signal bandwidth, frequency channel, code channel, transmit power, multipath profile and forward error correction scheme.

5 6. The method of claim 1, wherein the determined RF conditions include at least one of: received signal power, multipath characteristics and interference characteristics.

7. The method of claim 1, wherein the signal being transmitted contains at least one of control, audio, video and data information.

10 8. A communication node for communicating with other nodes in a network over communication channels, comprising:

a receiver configured to process a received signal transmitted over a communication channel to determine RF conditions on the communication channel;

15 a processor responsive to the RF conditions determined from the received signal for selecting an initial set of parameter values for transmitting a signal over the communication channel, and using the initial set of parameter values to identify other sets of parameter values as other potential candidates for transmitting the signal, wherein parameter values in said other sets of parameter values differ from parameter values in the initial set of parameter values by less than a predetermined amount, said processor choosing from among candidate sets of parameter values a selected set of parameter values having a highest expected performance among the candidate sets of parameter values; and

20 a transmitter configured to transmit the signal on the communication channel using the selected set of parameter values.

9. The communication node of claim 8, wherein said communication node is a mobile communication device.

10. The communication node of claim 8, wherein said communication node communicates with other nodes on a peer-to-peer basis.

11. The communication node of claim 8, wherein said communication node is a multimedia communication device capable of transmitting and receiving audio, video and data messages.

12. The communication node of claim 8, wherein said processor uses a previous set of
5 parameter values with which the received signal was transmitted to identify additional candidate sets of parameter values for transmitting the signal if the previous set of parameter values differs from the initial set of parameter values by more than a predetermined amount, wherein parameter values in said additional candidate sets of parameter values differ from parameter values in the previous set of parameter values by less than a predetermined amount; and

10 wherein the additional candidate sets of parameter values are among the candidate sets of parameter values from which the selected set of parameter values is chosen.

13. The communication node of claim 8, wherein said processor forms a system state vector from the initial set of parameter values, and carries out a system state transformation on said system state vector to choose the selected set of parameter values.

15 14. The communication node of claim 8, further comprising a memory for storing pre-computed weights representing the performance of each candidate set of parameter values, wherein the selected set of parameter values has a weight corresponding to a highest performance.

20 15. The communication node of claim 8, wherein the initial set of parameters includes at least one of: data rate, packet length, signal bandwidth, frequency channel, code channel, transmit power, multipath profile and forward error correction scheme.

16. The communication node of claim 8, wherein the determined RF conditions include at least one of: received signal power, multipath characteristics and interference characteristics.

25 17. The communication node of claim 8, wherein said communication node communicates on the communication channel using carrier sense multiple access with collision avoidance.

18. The communication node of claim 8, wherein said communication node defines the communication channel using code division multiple access and frequency division multiple access.

19. The communication node of claim 8, wherein said communication node transmits
5 a direct sequence spread spectrum signal.

20. The communication node of claim 8, wherein said communication node selects a set of parameter values for each message transmitted by said communication node.

21. A communication system, comprising:

10 a plurality of nodes communicating over communication channels, each of said nodes including: a receiver configured to process a received signal transmitted over a communication channel to determine RF conditions on the communication channel; a processor responsive to the RF conditions determined from the received signal for selecting an initial set of parameter values for transmitting a signal over the communication channel, and using the initial set of parameter values to identify other sets of parameter values as other potential candidates for
15 transmitting the signal, wherein parameter values in said other sets of parameter values differ from parameter values in the initial set of parameter values by less than a predetermined amount, said processor choosing from among candidate sets of parameter values a selected set of parameter values having a highest expected performance among the candidate sets of parameter values; and a transmitter configured to transmit the signal on the communication channel using
20 the selected set of parameter values.

22. The communication system of claim 21, wherein each node is a mobile communication device.

23. The communication system of claim 21, wherein nodes in said communication
25 system communicate with each other on a peer-to-peer basis.

24. The communication system of claim 21, wherein each node is a multimedia communication device capable of transmitting and receiving audio, video and data messages.

25. The communication system of claim 21, wherein said processor uses a previous set of parameter values with which the received signal was transmitted to identify additional candidate sets of parameter values for transmitting the signal if the previous set of parameter values differs from the initial set of parameter values by more than a predetermined amount, wherein parameter values in said additional candidate sets of parameter values differ from parameter values in the previous set of parameter values by less than a predetermined amount; and

wherein the additional candidate sets of parameter values are among the candidate sets of parameter values from which the selected set of parameter values is chosen.

26. The communication system of claim 21, wherein said processor forms a system state vector from the initial set of parameter values, and carries out a system state transformation on said system state vector to choose the selected set of parameter values.

27. The communication system of claim 21, wherein each node further comprises a memory for storing pre-computed weights representing the performance of each candidate set of parameter values, wherein the selected set of parameter values has a weight corresponding to a highest performance.

28. The communication system of claim 21, wherein the initial set of parameters includes at least one of: data rate, packet length, signal bandwidth, frequency channel, code channel, transmit power, multipath profile and forward error correction scheme.

29. The communication system of claim 21, wherein the determined RF conditions include at least one of: received signal power, multipath characteristics and interference characteristics.

30. The communication system of claim 21, wherein said communication system employs carrier sense multiple access with collision avoidance.

31. The communication system of claim 21, wherein said communication system employs code division multiple access and frequency division multiple access to define

32. The communication node of claim 21, wherein said node transmit direct sequence spread spectrum signals.

33. The communication node of claim 21, wherein each node selects a set of parameter
5 values for each message transmitted.